

CLAIMS

We claim:

- 1 1. A tendon-anchored offshore platform comprising a lateral mooring system (LMS), where
2 the LMS comprises a plurality of catenary mooring lines anchored to a seabed and attached to the
3 platform, where the LMS is designed to reduce installation and/or operation costs and/or to provide
4 installation and/or operation performance benefits and where the LMS can be attached to the
5 platform prior to, during or after tendon installation.
- 1 2. The platform of claim 1, wherein, the mooring lines are anchored to the seabed in a spaced
2 apart configuration surrounding an installation site of the platform, include buoys that adjust the
3 vertical component of the mooring line forces acting on the platform and attached to the platform
4 in a pattern adapted to allow the LMS to impart on the platform a force in any desired direction and
5 directed primarily parallel to a surface of the sea due to the buoys on the mooring lines.
- 1 3. The platform of claim 1, wherein the platform is a spar platform, tension leg platform or
2 extended-base tension leg platform.
- 1 4. The platform of claim 1, wherein the platform is a spar platform.
- 1 5. The platform of claim 1, wherein the platform is a tension leg platform.
- 1 6. The platform of claim 1, wherein the platform is an extended-base tension leg platforms.
- 1 7. A tendon-anchored offshore platform comprising a substructure supporting a deck, a
2 plurality of tendons anchoring the substructure to a seabed under tension and lateral mooring system
3 (LMS) having a plurality of catenary mooring lines anchored to the seabed and attached to the
4 platform, where the LMS is adapted to reduce installation and/or operation costs and/or to provide
5 installation and/or operation performance benefits.
- 1 8. The platform of claim 7, wherein, the mooring lines are anchored to the seabed in a spaced
2 apart configuration surrounding an installation site of the platform, include buoys that adjust the

3 vertical component of the mooring line forces acting on the platform and attached to the platform
4 in a pattern adapted to allow the LMS to impart on the platform a force in any desired direction and
5 directed primarily parallel to a surface of the sea due to the buoys on the mooring lines.

1 9. The platform of claim 7, wherein the platform is a spar platform, tension leg platform or
2 extended-base tension leg platform.

1 10. The platform of claim 7, wherein the platform is a spar platform.

1 11. The platform of claim 7, wherein the platform is a tension leg platform.

1 12. The platform of claim 7, wherein the platform is an extended-base tension leg platforms.

1 13. A method for installing a tension-anchored offshore platform comprising the steps of:
2 positioning a platform near a desired off-shore site or location;
3 attaching a plurality of seabed anchored lateral mooring lines to the platform;
4 adjusting lengths of the mooring lines to position and hold the platform on station over the
5 site;
6 ballasting the platform and attaching the pre-installed tendons to tendon connectors a base
7 of the platform.; and
8 deballasted the platform to tension the tendons.

9 14. The method of claim 13, further comprising the step of:
10 continuously or periodically adjusting the lengths of the mooring lines to maintain the
11 platform in a substantially zero-force condition.

1 15. The method of claim 13, further comprising the step of:
2 continuously or periodically monitoring forces acting on the platform via force sensor on the
3 tendons and the mooring lines; and
4 continuously or periodically adjusting the lengths of the mooring lines in response to the
5 forces acting on the platform to maintain the platform in a substantially zero-force condition.

1 16. The method of claim 13, further comprising the step of:
2 continuously or periodically receiving force data from sensors attached to the tendons and
3 the mooring lines;
4 continuously or periodically calculating a net force acting on the platform from the force
5 data; and
6 continuously or periodically adjusting the lengths of the mooring lines in response to the
7 calculated force acting on the platform to maintain the platform in a substantially zero-force
8 condition.

1 17. A method for installing an tendon-anchored offshore platform including the steps of:
2 attaching a plurality of temporary stabilization modules to platform and transporting the
3 platform near a desired off-shore site or location;
4 positioning the platform near the desired site
5 attaching a lateral mooring system including a plurality of seabed anchored lateral mooring
6 lines are attached to the platform;
7 adjusting lengths of the attached mooring lines to position and hold the platform on station
8 over the site;
9 ballasting the platform and attaching a plurality of pre-installed tendons to tendon connectors
10 on a base of the platform;
11 deballasing the platform to tension the tendons; and
12 removing the stabilization modules;
13 after tensioning, the mooring lines maybe disconnected, but preferably, the lines are left
14 attached to the platform and are used during post-installation operations to reduce horizontal
15 displacement due to wind and/or sea currents by adjusting the lengths of the mooring lines to impose
16 a force substantially equal and opposite to the environmental forces acting on the platform.

1 18. The method of claim 17, further comprising the step of:
2 continuously or periodically adjusting the lengths of the mooring lines to maintain the
3 platform in a substantially zero-force condition.

1 19. The method of claim 17, further comprising the step of:
2 continuously or periodically monitoring forces acting on the platform via force sensor on the

3 tendons and the mooring lines; and
4 continuously or periodically adjusting the lengths of the mooring lines in response to the
5 forces acting on the platform to maintain the platform in a substantially zero-force condition.

1 20. The method of claim 17, further comprising the step of:
2 continuously or periodically receiving force data from sensors attached to the tendons and
3 the mooring lines;
4 continuously or periodically calculating a net force acting on the platform from the force
5 data; and
6 continuously or periodically adjusting the lengths of the mooring lines in response to the
7 calculated force acting on the platform to maintain the platform in a substantially zero-force
8 condition.

1 21. A method for installing a tendon-anchored offshore platform including the steps of:
2 transporting the platform near an installation site;
3 attaching a lateral mooring system (LMS) including a plurality of seabed anchored mooring
4 lines to the platform;
5 adjusting lengths of the lines to position the platform on station over a pre-installed seabed
6 tendon anchor;
7 attaching a tendon to a working part of a drilling rig associated with a deck of the platform;
8 lowering the tendon until a distal end of the tendon having an anchor connector is positioned
9 directly above the tendon anchor, which has a tendon connector associated therewith;
10 stabbing the tendon into the anchor with sufficient force so that the anchor connector and the
11 tendon connector lockingly engage to form an installed tendon;
12 repeating the previous four step until all the tendons are installed;
13 adjusting lengths of the mooring lines to position and hold the platform on station over the
14 site;
15 ballasting the platform and attaching the pre-installed tendons to tendon connectors a base
16 of the platform.; and
17 deballasted the platform to tension the tendons.

18 22. The method of claim 21, further comprising the step of:

19 continuously or periodically adjusting the lengths of the mooring lines to maintain the
20 platform in a substantially zero-force condition.

1 23. The method of claim 21, further comprising the step of:

2 continuously or periodically monitoring forces acting on the platform via force sensor on the
3 tendons and the mooring lines; and

4 continuously or periodically adjusting the lengths of the mooring lines in response to the
5 forces acting on the platform to maintain the platform in a substantially zero-force condition.

1 24. The method of claim 21, further comprising the step of:

2 continuously or periodically receiving force data from sensors attached to the tendons and
3 the mooring lines;

4 continuously or periodically calculating a net force acting on the platform from the force
5 data; and

6 continuously or periodically adjusting the lengths of the mooring lines in response to the
7 calculated force acting on the platform to maintain the platform in a substantially zero-force
8 condition.

1 25. A method for drilling wells at a desired site using a tendon-anchored offshore platform
2 including the steps of:

3 transporting the platform near a drilling, production and installation site;

4 attaching a lateral mooring system (LMS) including a plurality of seabed anchored mooring
5 lines to the platform;

6 adjusting lengths of the mooring lines to position and hold the platform on station above a
7 well to be drilled;

8 ballasting the platform and attaching a plurality of pre-installed tendons associated with the
9 well to be drilled to tendon connectors on a base of the platform;

10 deballasting the platform to tension the tendons; and

11 drilling the well;

12 after well completion; repeating the previous four steps until all the wells have been drilled;

13 adjusting lengths of the mooring lines to position and hold the platform on station over a
14 production site;

15 ballasting the platform and attaching the pre-installed tendons to tendon connectors a base
16 of the platform.; and
17 deballasted the platform to tension the tendons

18 26. The method of claim 25, further comprising the step of:
19 after installation at the production site, continuously or periodically adjusting the lengths of
20 the mooring lines to maintain the platform in a substantially zero-force condition.

1 27. The method of claim 25, further comprising the step of:
2 after installation at the production site, continuously or periodically monitoring forces acting
3 on the platform via force sensor on the tendons and the mooring lines; and
4 continuously or periodically adjusting the lengths of the mooring lines in response to the
5 forces acting on the platform to maintain the platform in a substantially zero-force condition.

1 28. The method of claim 25, further comprising the step of:
2 after installation at the production site, continuously or periodically receiving force data from
3 sensors attached to the tendons and the mooring lines;
4 continuously or periodically calculating a net force acting on the platform from the force
5 data; and
6 continuously or periodically adjusting the lengths of the mooring lines in response to the
7 calculated force acting on the platform to maintain the platform in a substantially zero-force
8 condition.

1 29. The method of claim 25, further comprising the step of:
2 adjusting the lengths of the mooring lines to position and hold the platform on station over
3 each complete well; and
4 attaching a riser to each well and to the platform.